

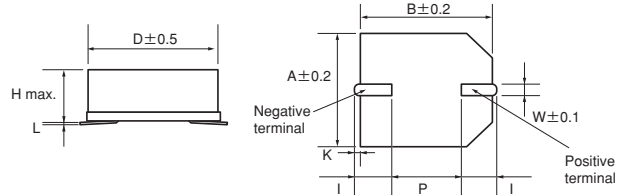
6. Rated Specifications

6.1 FC Series

Features

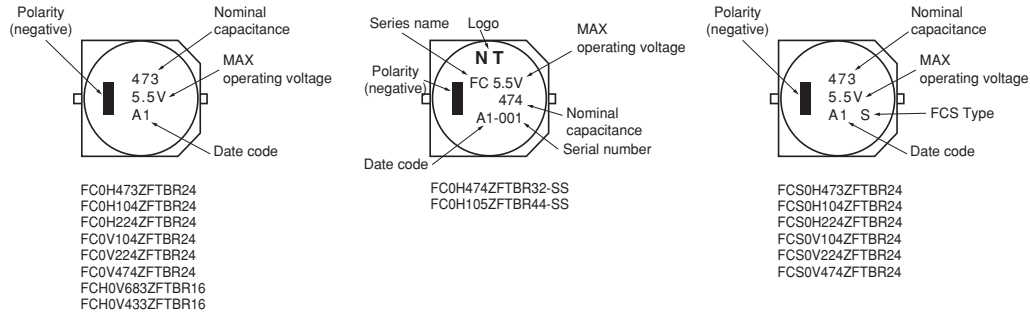
- Enables surface mounting.
- High rated voltage of 5.5V.
- High leakage reliability.

Dimensions



Markings

Displays nominal capacitance, MAX operating voltage serial number, polarity and etc.



Standard models

● FC Type

Part Number	Max. Operating Voltage (Vdc)	Nominal Capacitance Discharge system (F)	Max. ESR (at 1kHz) (Ω)	Max. current at 30 minutes (mA)	Voltage Holding Characteristic Min. (V)	Dimension (Unit:mm)										Weight (g)
						D	H	A	B	I	W	P	K	L		
FC0H473ZFTBR24	5.5	0.047	50	0.071	4.2	10.5	5.5	10.8	10.8	3.6±0.5	1.2	5.0	0.7±0.3	0 ^{+0.3} _{-0.1}	1.0	
FC0H104ZFTBR24	5.5	0.10	25	0.15	4.2	10.5	5.5	10.8	10.8	3.6±0.5	1.2	5.0	0.7±0.3	0 ^{+0.3} _{-0.1}	1.0	
FC0H224ZFTBR24	5.5	0.22	25	0.33	4.2	10.5	8.5	10.8	10.8	3.6±0.5	1.2	5.0	0.7±0.3	0 ^{+0.3} _{-0.1}	1.4	
FC0H474ZFTBR32-SS	5.5	0.47	13	0.71	4.2	16.0	9.5	16.3	16.3	6.8±1.0	1.2	5.0	1.2±0.5	0 ^{+0.5} _{-0.1}	4.0	
FC0H105ZFTBR44-SS	5.5	1.0	7	1.50	4.2	21.0	10.5	21.6	21.6	7.0±1.0	1.4	10.0	1.2±0.5	0 ^{+0.5} _{-0.1}	6.7	
FC0V104ZFTBR24	3.5	0.10	50	0.09	—	10.5	5.5	10.8	10.8	3.6±0.5	1.2	5.0	0.7±0.3	0 ^{+0.3} _{-0.1}	1.0	
FC0V224ZFTBR24	3.5	0.22	25	0.20	—	10.5	5.5	10.8	10.8	3.6±0.5	1.2	5.0	0.7±0.3	0 ^{+0.3} _{-0.1}	1.0	
FC0V474ZFTBR24	3.5	0.47	25	0.42	—	10.5	8.5	10.8	10.8	3.6±0.5	1.2	5.0	0.7±0.3	0 ^{+0.3} _{-0.1}	1.4	

● FCH Type

Part Number	Max. Operating Voltage (Vdc)	Nominal Capacitance Discharge system (F)	Max. ESR (at 1kHz) (Ω)	Max. current at 30 minutes (mA)	Voltage Holding Characteristic Min. (V)	Dimension (Unit:mm)										Weight (g)
						D	H	A	B	I	W	P	K	L		
FCH0V683ZFTBR16	3.6	0.068	40	0.062	—	6.8	3.7	6.8	6.8	2.9±0.5	0.7	2.5	0.7±0.3	0 ^{+0.3} _{-0.1}	0.3	
FCH0H433ZFTBR16	5.5	0.043	50	0.065	—	6.8	5.0	6.8	6.8	2.9±0.5	0.7	2.5	0.7±0.3	0 ^{+0.3} _{-0.1}	0.4	

● FCS Type

Part Number	Max. Operating Voltage (Vdc)	Nominal Capacitance Discharge system (F)	Max. ESR (at 1kHz) (Ω)	Max. current at 30 minutes (mA)	Voltage Holding Characteristic Min. (V)	Dimension (Unit:mm)										Weight (g)
						D	H	A	B	I	W	P	K	L		
FCS0H473ZFTBR24	5.5	0.047	100	0.071	4.2	10.7	5.5	10.8	10.8	3.9±0.5	1.2	5.0	0.9±0.3	0 ^{+0.3} _{-0.1}	1.0	
FCS0H104ZFTBR24	5.5	0.10	50	0.15	4.2	10.7	5.5	10.8	10.8	3.9±0.5	1.2	5.0	0.9±0.3	0 ^{+0.3} _{-0.1}	1.0	
FCS0H224ZFTBR24	5.5	0.22	50	0.33	4.2	10.7	8.5	10.8	10.8	3.9±0.5	1.2	5.0	0.9±0.3	0 ^{+0.3} _{-0.1}	1.4	
FCS0V104ZFTBR24	3.5	0.10	100	0.09	—	10.7	5.5	10.8	10.8	3.9±0.5	1.2	5.0	0.9±0.3	0 ^{+0.3} _{-0.1}	1.0	
FCS0V224ZFTBR24	3.5	0.22	50	0.20	—	10.7	5.5	10.8	10.8	3.9±0.5	1.2	5.0	0.9±0.3	0 ^{+0.3} _{-0.1}	1.0	
FCS0V474ZFTBR24	3.5	0.47	50	0.42	—	10.7	8.5	10.8	10.8	3.9±0.5	1.2	5.0	0.9±0.3	0 ^{+0.3} _{-0.1}	1.4	



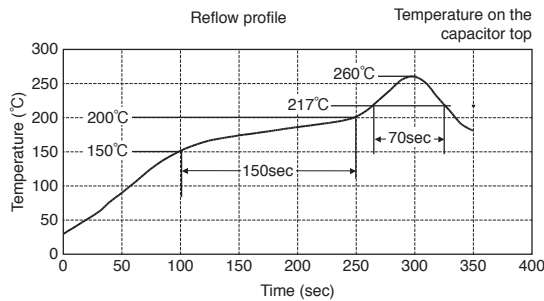
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Precautions for use

- This series is exclusively for reflow soldering. It is designed for thermal conduction system such as combination use of infrared ray and heat blow. Consult with NEC TOKIN before applying other methods.
- The reflow condition must be kept within reflow profile graphs shown below.
- Applying reflow soldering is limited to 2 times. After the first reflow, cool down the capacitor thoroughly to 5-35°C before the second reflow.

Always consult with NEC TOKIN when applying reflow soldering in a more severe condition than the condition described here.

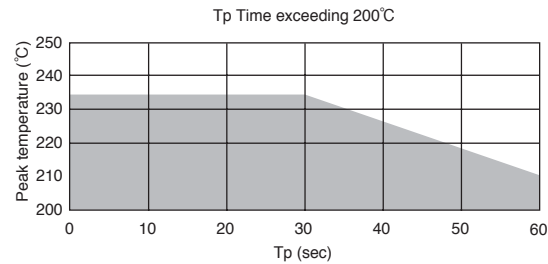
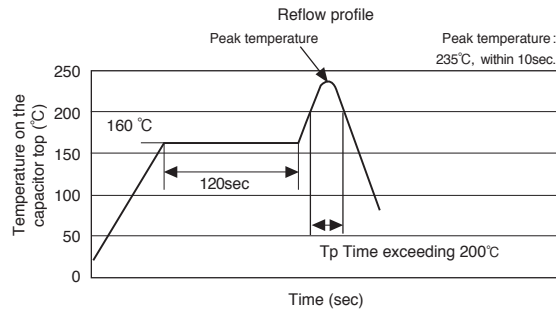
• FCS Type



• Above "Reflow Profile" graph indicates temperature at the terminals and capacitor top.

Peak temperature	Below 260 °C
Over 255 °C	Within 10sec.
Over 230 °C	Within 45sec.
Over 220 °C	Within 60sec.
Over 217 °C	Within 70sec.
Time between 150 °C to 200 °C (temperature zone over 170 °C =within 50sec.)	150sec.

• FC, FCH Type



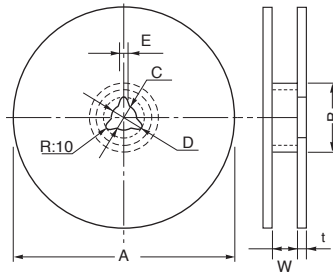
• Above "Reflow Profile" graph indicates temperature at the terminals and capacitor top.



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Tape and Reel Dimensions

[Reel Dimensions]

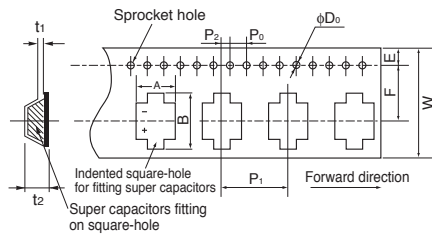


(mm)

Mark	TBR16	TBR24		TBR32	TBR44
A	380±2	380±2		330±2	380±2
B	80±1	Product height 5.5mm	80±1	100±1	100±1
		Product height 8.5mm	100±1		
C	13±0.5	13±0.5		13±0.5	13±0.5
D	21±0.8	21±0.8		21±0.8	21±0.8
E	2±0.5	2±0.5		2±0.5	2±0.5
W	17.5±1.0	Product height 5.5mm	25.5±0.5	33.5±1.0	45.5±1.0
		Product height 8.5mm	25.5±1.0		
t	2.0	2.0		2.0	2.0

Dimensions of indented [square-hole plastic tape]

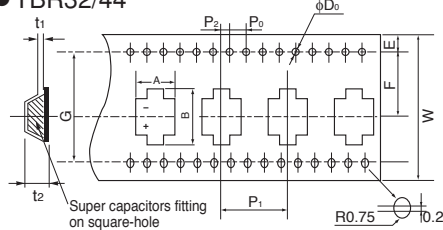
● TBR16/24



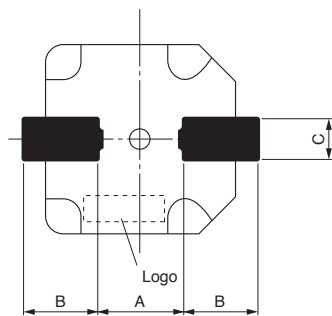
(mm)

Mark	TBR16	TBR24	TBR32	TBR44	
W	16.0	24.0	32.0	44.0	
A	7.2	11.4	18.0	23.0	
B	9.0	13.0	20.0	25.0	
P ₀	4.0	4.0	4.0	4.0	
P ₁	12.0	16.0	24.0	32.0	
P ₂	2.0	2.0	2.0	2.0	
F	7.5	11.5	14.2	20.2	
φ D ₀	1.55	1.55	1.55	1.55	
t ₁	0.4	0.4	0.5	0.5	
t ₂	5.0	Product height 5.5mm	6.0	10.0	12.0
		Product height 8.5mm	8.4		
G	-	-	28.4	40.4	

● TBR32/44



Recommended land pattern



Land pattern

(mm)

Part Number	A	B	C
FC0H473ZFTBR24	5.0	4.6	2.5
FC0H104ZFTBR24	5.0	4.6	2.5
FC0H224ZFTBR24	5.0	4.6	2.5
FC0H474ZFTBR32-SS	5.0	10.0	2.5
FC0H105ZFTBR44-SS	10.0	10.5	3.5
FC0V104ZFTBR24	5.0	4.6	2.5
FC0V224ZFTBR24	5.0	4.6	2.5
FC0V474ZFTBR24	5.0	4.6	2.5
FCH0V683ZFTBR16	2.5	4.0	1.4
FCH0H433ZFTBR16	2.5	4.0	1.4
FCS0H473ZFTBR24	5.0	4.9	2.5
FCS0H104ZFTBR24	5.0	4.9	2.5
FCS0H224ZFTBR24	5.0	4.9	2.5
FCS0V104ZFTBR24	5.0	4.9	2.5
FCS0V224ZFTBR24	5.0	4.9	2.5
FCS0V474ZFTBR24	5.0	4.9	2.5

Lead terminal

(mm)

Part Number	A	B	C
FC0H473ZFTBR24	5.0	3.6	1.2
FC0H104ZFTBR24	5.0	3.6	1.2
FC0H224ZFTBR24	5.0	3.6	1.2
FC0H474ZFTBR32-SS	5.0	6.8	1.2
FC0H105ZFTBR44-SS	10.0	7.0	1.4
FC0V104ZFTBR24	5.0	3.6	1.2
FC0V224ZFTBR24	5.0	3.6	1.2
FC0V474ZFTBR24	5.0	3.6	1.2
FCH0V683ZFTBR16	2.5	2.9	0.7
FCH0H433ZFTBR16	2.5	2.9	0.7
FCS0H473ZFTBR24	5.0	3.9	1.2
FCS0H104ZFTBR24	5.0	3.9	1.2
FCS0H224ZFTBR24	5.0	3.9	1.2
FCS0V104ZFTBR24	5.0	3.9	1.2
FCS0V224ZFTBR24	5.0	3.9	1.2
FCS0V474ZFTBR24	5.0	3.9	1.2



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Specifications

Item	Series name		FC		Test conditions (conforming to JIS C 5160-1)
			5.5V type, 3.5V type		
Category temperature range			-25 °C to +70 °C		
MAX operating voltage			5.5Vdc, 3.5Vdc		
Capacitance			Refer to standard ratings		Refer to "Measurement Conditions"
Capacitance allowance			+80 %, -20 %		Refer to "Measurement Conditions"
ESR			Refer to standard ratings		Measured at 1kHz, 10mA ; See also "Measurement Conditions"
Current (30-minutes value)			Refer to standard ratings		Refer to "Measurement Conditions"
* Surge	Capacitance			More than 90% of initial ratings	Surge voltage : 4.0V (3.5V type, 3.6V type) : 6.3V (5.5V type) Charge : 30 sec. Discharge : 9min 30sec. Number of cycles : 1000 Series resistance : 0.043F, 0.047F 300Ω : 0.068F 240Ω : 0.10F 150Ω : 0.22F 56Ω : 0.47F 30Ω : 1.0F 15Ω Discharge resistance : 0Ω Temperature : 70±2 °C
	ESR			Not to exceed 120% of initial ratings	
	Current (30 minutes value)			Not to exceed 120% of initial ratings	
	Appearance			No obvious abnormality	
* Characteristics in different temperature	Capacitance	Phase 2	50% higher than initial value		Conforms to 4.17 Phase1 : +25±2 °C Phase2 : -25±2 °C Phase4 : +25±2 °C Phase5 : +70±2 °C Phase6 : +25±2 °C
	ESR		400% or less than initial value		
	Capacitance	Phase 3			
	ESR				
	Capacitance	Phase 5	200% or less than initial value		
	ESR		Satisfy initial ratings		
	Current (30 minutes value)			1.5CV (mA) or below	
	Capacitance	Phase 6	Within ±20% of initial value		
	ESR		Satisfy initial ratings		
Current (30 minutes value)	Satisfy initial ratings				
* Vibration resistance	Capacitance			Conforms to 4.13 Frequency : 10 to 55 Hz Testing time : 6 hours	
	ESR	Satisfy initial ratings			
	Current (30 minutes value)				
	Appearance	No obvious abnormality			
* Solder heat resistance	Capacitance			Cooled down to ambient temperature after reflow soldering, then the product must fulfill the condition stated left. (See page 10 for reflow condition)	
	ESR	Satisfy initial ratings			
	Current (30 minutes value)				
	Appearance	No obvious abnormality			
* Temperature cycle	Capacitance			Conforms to 4.12 Temperature condition : -25 °C → Room temperature → +70 °C → Room temperature Number of cycles : 5 Cycles	
	ESR	Satisfy initial ratings			
	Current (30 minutes value)				
	Appearance	No obvious abnormality			
* High temp. and high humidity resistance	Capacitance	Within ±20% of initial value		Conforms to 4.14 Temperature : 40±2 °C Relative humidity : 90 to 95 %RH Testing time : 240±8 hours	
	ESR	Not to exceed 120% of initial ratings			
	Current (30 minutes value)	Not to exceed 120% of initial ratings			
	Appearance	No obvious abnormality			
* High temperature load	Capacitance	Within ±30% of initial value		Conforms to 4.15 Voltage applied : MAX operating voltage Series protection resistance : 0Ω Testing time : 1000*Hours	
	ESR	Below 200% of initial ratings			
	Current (30 minutes value)	Below 200% of initial ratings			
	Appearance	No obvious abnormality			
* Self discharge characteristics (voltage holding characteristics)			5.5V type: Voltage between terminal leads higher than 4.2V	Charging condition	Voltage applied : 5.0Vdc (Terminal at the case's side be negative) Series resistance : 0Ω Charging time : 24 hours
			3.5V type: Not specified	Storage	Let stand for 24 hours in condition described below with terminals opened. Ambient temperature : Lower than 25 °C Relative humidity : Lower than 70%RH

As for items with "***" , it must fulfill the above condition after the reflow soldering. (See page 10 for reflow conditions)

12 Super Capacitors Vol.12



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